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PROCEEDINGS
OF THE
AMERICAN SOCIETY
OF
CIVIL ENGINEERS

VOL. XLVIII—No. 7

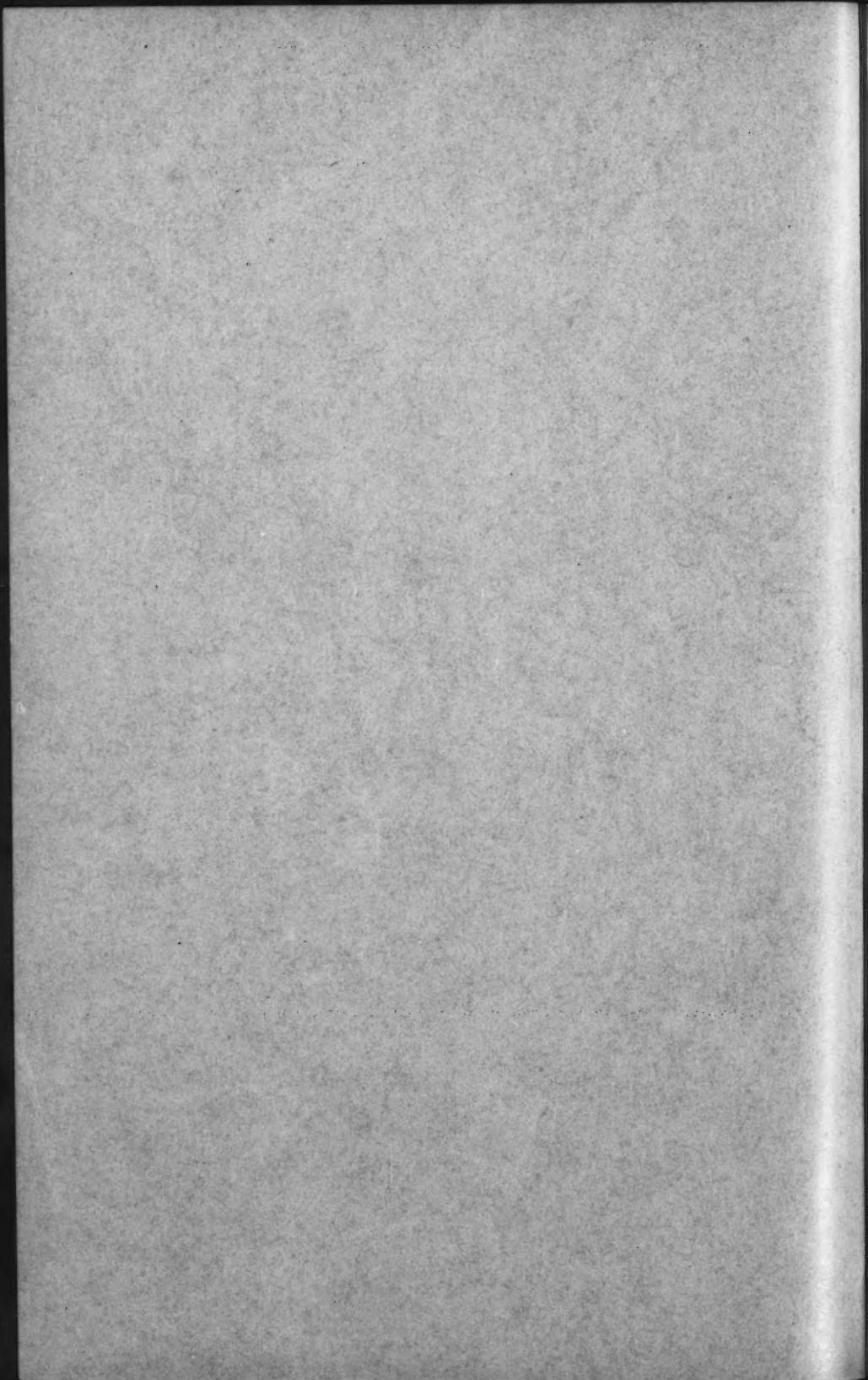


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OF THE
AMERICAN SOCIETY
OF
CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XLVIII—No. 7.

SEPTEMBER, 1922

Edited by the Secretary, under the direction of the Committee on
Technical Activities and Publications.

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NEW YORK 1922

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AMERICAN SOCIETY OF CIVIL ENGINEERS
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PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed
in its publications.

SOCIETY AFFAIRS

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ITEMS OF INTEREST

The Committee on Publications will be glad to receive communications of general interest to the Society, and will consider them for publication in *Proceedings* in "Items of Interest". This is intended to cover letters or suggestions from our membership concerning matters which are not of a technical character. Such communications, however, must not be controversial or commercial.

Change of Date for Issuing *Proceedings*

This number of *Proceedings* is the first to be published in pursuance of a new policy in regard to the date of issue.

Heretofore, the *Proceedings* have been issued on the fourth Wednesday of each month, except June and July. In the future, the *Proceedings* of any month will be issued on the last day of the preceding month, for example, the September number is issued on the 31st of August.

For this reason, the minutes of the meeting of the Society of September 6th, 1922, will appear in the October *Proceedings*.

Honorary Members Elected

At the meeting of the Board of Direction on June 19th, 1922, the Tellers appointed to canvass the Ballots for Honorary Members reported the election of Leon-Jean Chagnaud, Sir Maurice Fitzmaurice, Clemens Herschel, Past-President, Am. Soc. C. E., John F. Stevens, M. Am. Soc. C. E., and W. C. Unwin, as Honorary Members of the Society. The following brief sketches of their lives and work are presented herewith for the information of the membership.

LEON-JEAN CHAGNAUD

Leon-Jean Chagnaud was born at Le Bourg d'hem, in the Department of Creuse, France, and in 1881 entered the École des Arts et Métiers at Châlons sur Marne. Soon after his graduation he reconstructed the locks of the Canal du Centre and established the massive concrete fortifications about Toul. He also built 11 km. of strategic roads between Vitry and Blesmes.

Charged with the execution of subterranean excavation (the "Collecteur de Clichy", one of the large trunk sewers of Paris) in the center of Paris and its outlying Districts, a work carried on at a minimum depth of 1 m. below the surface and without interruption to traffic, he was largely responsible for the development of the modern method of shield tunneling for subterranean and subaqueous excavation. It was the first use of this method in Paris.

The tunnels for crossing the Alps at Loëtschberg and Moutier-Longeau were planned and executed by M. Chagnaud, a difficult undertaking on account of the danger from avalanches.

On the construction of the Métropolitain Line No. 4, in Paris, from the Porte de Clignancourt to the Porte d'Orléans that crosses under the two branches of the Seine and under the Isle de la Cité, he sank the huge shafts at the Place St. Michael and the Cité Stations, which were sunk as caissons and utilized to form the permanent lining. For the execution of this difficult construction, which required freezing of the soil and injections of cement in certain sections, he was rewarded by the Prix Berger and the bestowal of the Legion d'Honneur.

M. Chagnaud has served the State as a Member of the Senate, and, in 1921, was the President of the Société des Ingénieurs Civils de France.

SIR MAURICE FITZMAURICE

Sir Maurice Fitzmaurice was born on May 11th, 1861. He was educated at Trinity College, Dublin, receiving degrees of M. A. and M. E. (Dublin), and LL. D. (Birmingham). He was apprenticed to the late Sir Benjamin Baker, Hon. M. Am. Soc. C. E. From 1901-12 he was Chief Engineer to the London County Council and, from 1912 to 1918, served as Chairman of the Admiralty Advisory Committee on Naval Works. From 1914-19, he was Chairman of the Committee dealing with Civilian Labor, London Defences (War Office), and from 1917-19, he acted as Chairman of the Canal Control Committee.

(Board of Trade). He was also a Member of the War Office Committee on Huttred Camps and from 1918-19 was Chairman of the Nile Projects Committee (Foreign Office). In 1919, he also served as Chairman of the Committee on Aerodrome Accounts (Treasury). He was also a Member of the Advisory Council of the Science Museum. He acted as Engineer of the Rotherhithe Tunnel, New Vauxhall Bridge, Kingsway and Tramway Subway, the Electric Tramways in London, and the duplication and extension of the London Main Drainage System and as Senior British Engineer on the Suez Canal Commission. In 1913, at the request of the Commonwealth Government, he visited Australia to advise on Naval Harbors and Works. Sir Maurice was a Lieutenant-Colonel in the Engineer and Railway Staff Corps, and in 1915 and again in 1918, he visited the British front in Flanders at the request of the War Office, to advise on questions of drainage. He was also engaged on the Forth Bridge and was consulted regarding railways and docks in Canada, the Blackwall Tunnel, and the Nile Reservoir Dam, Assouan, Egypt. From 1916-17 he served as President of the Institution of Civil Engineers. He is also a Member of the Institution of Mechanical Engineers, Honorary Fellow of the Society of Engineers, Honorary Member of the Royal Engineers Institution, Member of the Canadian Institute of Engineers, Vice-Chairman of the Engineering Standards Committee, Vice-Chairman of the Institute of Transport, and Member of the Advisory Council on Scientific and Industrial Research. He was knighted in 1912. He has also received Orders, Medals, etc., as follows: C. G. M., 1902; F. R. S., 1919; Order of Mejidieh, Second Class, 1901; and the Telford and Watt Gold Medals of the Institution of Civil Engineers. He is the author of books on "Plate Girder Railway Bridges", "The Thames and Lea", "London County Bridges", "Main Drainage of London", and many papers.

CLEMENS HERSCHEL

Clemens Herschel, Past-President, Am. Soc. C. E. (Director, 1891; Vice-President, 1915-16; President, 1916), was born in 1842. He was graduated from the Lawrence Scientific School of Harvard University in 1860. He then went abroad to pursue further engineering studies in France and Germany.

Returning to the United States, he undertook a variety of engineering work chiefly in New England, giving much attention to bridge work and, in 1875, he published a treatise on continuous revolving draw-bridges. He was connected at one time with the Boston Sewer Department and served for two years as a Member of the Massachusetts Railroad Commission. After a period of service under the late James B. Francis, Past-President, Am. Soc. C. E., he was appointed, in 1879, to the position of Hydraulic Engineer of the Holyoke Water Power Company. He constructed the famous Holyoke Testing Flume, and established a system of metering and of recording the water consumption of the turbines in the Holyoke Mills. The need of an instrument for accurately measuring the flow of water in large pipes led to his invention of the Venturi Meter, which was described in a paper entitled "The Venturi

Water Meter: An Instrument Making Use of a New Method of Gauging Water; Applicable to the Cases of Very Large Tubes, and of a Small Value Only, of the Liquid to be Gauged", presented before the Society at the meeting of December 21st, 1887, and published in *Transactions* Vol. XVII, for which he received the Thomas Fitch Rowland Prize in 1888. He also received the Elliott Cresson Gold Medal of the Franklin Institute, Philadelphia, Pa., for his work on the Venturi Water Meter.

In 1889 he was made Chief Engineer of the East Jersey Water Company, which was then embarking on a large enterprise for the supply of potable water to the cities and towns of Northern New Jersey. He was Consulting Engineer for the Niagara Falls Power Company, and was a Member of the Commission that made a report on the practicability of the deep rock tunnel plan of distribution of the Catskill Water in New York City. He was employed by the United States Government to investigate and report on the development of water power at Great Falls on the Potomac River.

He served as Treasurer of the Boston Society of Civil Engineers from 1874 to 1880, and was President of that Society in 1890-91. He is also a Member of the Institution of Civil Engineers of Great Britain.

He has published a translation of "Frontinus, and his II Books on the Water Supply of the City of Rome, A. D. 97". The "115 Hydraulic Experiments", another treatise on hydraulics, was published by Mr. Herschel in 1897.

JOHN FRANK STEVENS

John Frank Stevens, M. Am. Soc. C. E., was born in West Gardiner, Me., on April 24th, 1853.

He was Assistant Engineer, City of Minneapolis, Minn., from 1874 to 1876; became Chief Engineer of the Sabine Pass and Northwestern Railway in 1876; and acted as Assistant Engineer for the Denver and Rio Grande Railway in 1879, and the Chicago, Milwaukee and St. Paul Railway from 1880 to 1882.

Mr. Stevens acted as Division Engineer for the Canadian Pacific Railway from 1882 to 1886, when he returned to the Chicago, Milwaukee and St. Paul Railway as Assistant Engineer. From 1887 to 1889, he was Principal Assistant Engineer of the Duluth, South Shore and Atlantic Railway, when he became Assistant Engineer of the Spokane Falls and Northern Railway.

Mr. Stevens became Principal Assistant Engineer with the Great Northern Railway in 1889, and was successively promoted to Assistant Chief Engineer in 1893, Chief Engineer in 1895, and General Manager in 1902. In 1903, he joined the staff of the Chicago, Rock Island and Pacific Railway Company as Chief Engineer, and became Second Vice-President in 1904.

From 1905 to 1907, Mr. Stevens was Chief Engineer of the Panama Canal; and, in 1907, he acted as Chairman of the Isthmian Canal Commission.

In 1907 he became Vice-President of the New York, New Haven and Hartford Railroad and had charge of operation. From 1909 to 1911, he became President successively of the Spokane, Portland and Seattle Railway, the

Oregon Electric Railway, the Oregon Trunk Railway, and the Pacific and Eastern Railway. He was head of the American Railway Mission to Russia in 1917, and acted as Director of a Corps of Railway Experts in Manchuria.

Mr. Stevens is an Honorary Member of the Association of Chinese and American Engineers, and President of the Inter-Allied Technical Board supervising the technical and economic operation of the Siberian and Chinese Eastern Railway, with headquarters at Harbin, Manchuria.

WILLIAM CAWTHORNE UNWIN

William Cawthorne Unwin was born on December 12th, 1838, at Coggeshall, Essex, England. He was educated at the City of London School and was a pupil of the late Sir William Fairbairn. From 1861-68, he was Manager of Engineering Works, and from 1868-72, was Instructor at the Royal School of Naval Architecture and Marine Engineering, Kensington. From 1872-85, he was Professor of Hydraulic Engineering, Royal Indian Engineering College, Cooper's Hill and from 1884-1904 he was Professor of Engineering, Central Technical College of the Guilds of London, Kensington. He was also Secretary of the International Commission on the Utilization of Niagara, and in 1892 was President of Section G of the British Association. In 1894 Professor Unwin was a member of the Council of the Royal Society and in 1911, he was President of the Institution of Civil Engineers. He also served in 1915-16 as President of the Institution of Mechanical Engineers. From 1915-18 he was a Member of the Management Board of the Metropolitan Munitions Committee. From 1900 to 1905 and since 1911 he has served on the Senate of London University. Mr. Unwin was awarded the Kelvin Medal in 1921, and has had conferred on him the degree of LL. D. from Edinburgh, is a Fellow of the Royal Society; Member of the Institution of Civil Engineers; Honorary Life Member of the Institution of Mechanical Engineers; Honorary Member, American Society of Mechanical Engineers; and Honorary Associate of the Royal Institution of British Architects. He has published books on "Wrought Iron Bridges and Roofs" (1869), "Machine Design" (1877), "Testing of Materials of Construction" (1888), "The Development and Transmission of Power from Central Stations" (1894), "Treatise on Hydraulics" (1907), and has contributed articles on Hydraulics and Bridges for the Encyclopedia Britannica. He is Professor Emeritus of the Central Technical College, City and Guilds of London Institute.

Holland Engineers Honor Dr. Chas. Warren Hunt

The Koninklijk Instituut van Ingenieurs (Royal Society of Engineers of Holland), has elected Dr. Chas. Warren Hunt, Secretary Emeritus of the Society, as an Honorary Member, and has invited the Society to send a delegate to the celebration of its Seventy-fifth Anniversary to be held September 8th, 1922, at The Hague. President Freeman has appointed Dr. Hunt to represent the Society at the Anniversary, and he sailed for Europe on August 19th, 1922.

International Congress of Engineering

The Society has been invited by the Club de Engenharia, Rio de Janeiro, Brazil, to take part in the International Congress of Engineering which is to be held under the auspices of the Brazilian Government in connection with the opening of the Brazilian International Exposition in celebration of the first Centennial of Brazilian Independence.

An Editorial Committee from the four National Societies composed of P. H. Thomas, M. Am. Soc. M. E., *Chairman*, Ira W. McConnell, M. Am. Soc. C. E., G. W. Tower, Jr., M. Am. Inst. M. E., Maurice Coster, Fellow, Am. Inst. Elec. Engrs., and Ernest Hartford, Assoc. Am. Soc. M. E., has been appointed to arrange for and co-ordinate papers for a technical program. C. H. Crawford, M. Am. Soc. M. E., is Chairman of a Local Committee in Brazil, that is co-operating with the Editorial Committee.

Messrs. Walter Charnley, C. W. Comstock, V. L. Havens, W. G. McConnel, A. Y. Sundstrum, P. B. Easterbrooks, L. C. Heilbronner, Armando de Arruda Pereira, George Ribeiro, George Schobinger, Victor da Silva Freire, T. P. Stevenson, B. S. Thayer, Fred Lavis, and A. W. K. Billings, have been appointed by President Freeman as delegates of the Society to the International Congress.

ACTIVITIES OF LOCAL SECTIONS***Meetings of Colorado Section**

A regular meeting of the Colorado Section was held at the Metropole Hotel, Denver, Colo., on April 28th, 1922, as a joint meeting with the Colorado Section of the American Society of Mechanical Engineers; President L. D. Crain, of the Colorado Section of the American Society of Mechanical Engineers, presided; and there were present, also, about 30 members of both Sections.

The address of the evening was made by Mr. F. W. Bartlett who presented an interesting paper on "Radio", illustrating his remarks with one of the latest types of receiving apparatus. The subject was discussed freely by the members present, particularly the possibilities of the commercial side of this new industry. In addition, a radio concert was also given.

MEETING OF JULY 15TH, 1922

A regular meeting of the Colorado Section was held at the Metropole Hotel, Denver, Colo., on July 15th, 1922; President A. N. Miller in the chair; Thomas H. Olds, Secretary; and present, also, 11 members and 9 guests.

The minutes of the meetings of March 27th and April 28th, 1922, were read and approved. An omission in the minutes of the meeting of February 13th, 1922, was brought to the notice of the Section, and on motion, duly seconded, the minutes of that meeting were corrected to include the following: "The Secretary read a letter from the Parent Society requesting that consideration be given the question of the Society joining the Federated Engineering Societies. The question was put to a vote and the majority were opposed to joining the Federated Engineering Societies", and the Secretary was instructed to notify the Secretary of the Society of the omission.

On motion, duly seconded, the resignations of Messrs. A. L. Moser and J. S. Bright as members of the Section, were accepted.

The Secretary presented a letter from the Acting Secretary of the Society relative to a "dignified campaign for increased membership to the American Society of Civil Engineers". A motion that this matter be referred to a committee to canvass the membership of the Section was defeated. It was then moved, seconded, and carried, that the Section go on record as opposed to a dignified campaign for an increase in membership, as suggested, and the Secretary was instructed to inform the Secretary of the Society of this action.

The Secretary presented a financial report for 1921-1922, and Messrs. Bishop and Rose were named to audit the account and report at the next regular meeting of the Section.

President A. N. Miller presented an interesting paper on "Coal and Water Gas Manufacture and Distribution", in which he discussed the various steps in the manufacture of gas and the presence and utilization of numerous by-products.

J. Waldo Smith, M. Am. Soc. C. E., formerly Chief Engineer of the Board of Water Supply of New York City, who was in Denver as a member of the

* For list of Local Sections, Officers, etc., see p. 559.

Board of Consulting Engineers for the Moffat Tunnel Commission, was introduced by President Miller and addressed the meeting briefly on the "present multiplicity of administrative bodies in connection with public works and the impediment that the attendant 'red tape' usually offered to the rapid construction of such works".

J. Vipond Davies, M. Am. Soc. C. E., President of United Engineering Society, who was also in Denver as a member of the Board of Consulting Engineers for the Moffat Tunnel Commission, was next introduced, and discussed the affairs of the Federated American Engineering Societies and Engineering Foundation, outlining the origin, growth, and present status of these organizations. He also spoke of the difficulty in securing large attendance at meetings of Local Sections and outlined the proposed program of the New York Section for the coming year.

D. W. Brunton, Chairman of the Board of Consulting Engineers for the Moffat Tunnel Commission, spoke briefly of the Moffat Tunnel, and related some of the amusing and interesting experiences in connection with his work in the examination of patents during the World War.

H. S. Sands, President of the Colorado State Board of Engineer Examiners, addressed the meeting on the subject of the Engineering Library which it is proposed to purchase with funds accumulated from the payment of license fees, and stated that the Librarian of the Engineering Societies Library had promised to come to Denver and assist in the selection of books for the proposed Engineering Library which will probably be housed in the Denver Public Library.

The following officers were elected for the ensuing year: President, Thomas H. Olds; Vice-President, I. C. Crawford; and Secretary-Treasurer, R. I. Meeker.

Meetings of Duluth Section

A regular meeting of the Duluth Section was called to order at 12:15 P. M., June 19th, 1922; President W. H. Hoyt in the chair; W. G. Zimmermann, Secretary; and present, also, 20 members and 1 guest.

The minutes of the Annual Meeting, held on May 15th, 1922, were read and approved.

President Hoyt announced the appointment of the following Committees for the coming year: Entertainment: Messrs. Dickerson, Pickles, Kelly, and Stack; Publicity: Messrs. Hawley, McCool, and Ash; Auditing: Messrs. Taylor and Reed; Papers: Messrs. Darling, Dresser, and Lawrie; and Library: Messrs. Hutchinson, Ayres, and Christie.

The Secretary presented letters from Alfred D. Flinn, M. Am. Soc. C. E., Secretary of Engineering Foundation, relative to his proposed visit to Duluth, and on motion, duly seconded, President Hoyt appointed a committee of three, consisting of Messrs. Christie, Stack, and Marks, to make arrangements for a joint dinner and meeting on July 29th, 1922, of the engineers in Duluth and on the Range, and the Secretary was instructed to write to Mr. Flinn to that effect. A letter was also read from Mr. W. G. Swart, General Manager of the Mesabi Iron Company, at Babbitt, Minn., relative to Mr. Flinn's visit,

and the Secretary was instructed to invite Mr. Swart and others from Babbitt to attend the proposed meeting in Duluth.

A letter was presented from Acting Secretary Chandler of the Society relative to the suggestion by President Freeman in regard to a dignified campaign for an increased membership in the Society.

A report of the Committee on the Standardization of Map Scales was presented by Maj. Edwin H. Marks and on motion, duly seconded, the report was adopted with the decision that the matter be laid over for discussion at the next meeting of the Section.

MEETING OF JULY 17TH, 1922

A regular meeting of the Section was called to order at 12:15 p. m., on July 17th, 1922; Vice-President O. H. Dickerson in the chair; W. G. Zimmermann, Secretary; and present, also, 16 members.

The minutes of the meeting of June 19th, 1922, were read and approved.

The Secretary presented a letter from Acting Secretary Chandler in reference to the proposed Sub-Committee on Harbors and Waterways, which is to be appointed to keep the Committee on Publications advised of important local developments worthy of consideration by the Society. It was announced that the Board of Direction of the Section had forwarded the name of Mr. J. H. Darling as a prospective member for the proposed Sub-Committee.

The Secretary also called attention to a letter from Acting Secretary Chandler relative to discussion on the paper "Locomotive Loadings for Railway Bridges" by D. B. Steinman, M. Am. Soc. C. E., which is to be presented at the meeting of the Society on September 6th, 1922. Mr. Chandler requested that the Section take part in the discussion, and the Chairman urged the members interested in the subject to do so.

Mr. Frank Hutchinson reported for the Library Committee that arrangements could be made with the Public Library of the City of Duluth to have the set of *Transactions* offered by the Society to Local Sections catalogued and placed on file therein for reference. After discussion of the subject, on motion, duly seconded, the Secretary was instructed to request the Society to reserve a set of *Transactions* for the Section, until it could be determined whether the Section or the City of Duluth would pay for the binding.

The report of the Committee on Standardization of Map Scales was again presented by the Chairman, Maj. Edwin H. Marks, and after a short discussion, on motion, duly seconded, the resolution contained in the report was adopted, and the Secretary was instructed to forward the same to the Society and also to all Local Sections and to Director Anson Marston.

Resolution of Illinois Section in re Joining Federation*

The following resolution relating to the question of the Society joining the Federated American Engineering Societies was adopted at the meeting of the Illinois Section held March 24th, 1922:

"Whereas, The Board of Direction, Am. Soc. C. E., has asked local sections for an expression as to the advisability of the Society becoming a member of

* This resolution supplements the summary published in May, 1922, *Proceedings*, p. 378.

the Federation of Engineering Societies; and has not submitted any information regarding financial and other considerations that must be known in order for this section to intelligently pass upon the subject; and

"Whereas, A majority of the Society voted negatively on the question of joining the Federated American Engineering Societies a few months ago and also in view of the present unsatisfactory financial condition of our own Society which tends to restrict its activities, therefore

"Resolved: The Board of Direction be requested to fully advise the membership of our Society regarding the past and prospective activities, membership, resources and expenditures of the Federated American Engineering Societies, the expense attendant upon membership in the Federation, and whether it is likely the expenses will be increased; also whether, in view of the present financial condition of our Society, the expense of membership in the Federation can be borne; also to what extent, if any, it will be necessary to curtail the proper and desired activities of our Society if it joins the Federation and further

"Resolved: That we believe fully in the advantage of co-operative effort on the part of professional engineering societies in making the profession of engineering of greater service and increasing its prestige, and are in sympathy with the work of the Federated American Engineering Societies in such co-operative efforts as will advance the standing and usefulness of this Society and increase the welfare of its members, in so far as this can be brought about without lessening the functions and activities of this Society which fall within its own proper sphere of individual initiative and activity, and further

"Resolved: Pending further action by the entire membership of the Society, based upon a fuller knowledge of the issues involved, it seems advisable that the Board refrain from committing our Society in this matter and that no commitment be made by the Board except as based upon the results of the vote of the Society's entire membership."

New Officers for Kansas State Section

President L. E. Conrad of the Kansas State Section, has declared the election of Con M. Buck, M. Am. Soc. C. E., as Vice-President of the Section.

Sacramento Section Organizes

The Sacramento Section has recently been organized with an approximate membership of 53. Officers have been elected for the ensuing year, as follows: President, Albert Givan; First Vice-President, Harry A. Armstrong; Second Vice-President, H. E. Warrington; Secretary, Joseph W. Gross; Treasurer, H. A. Alderson; and Member of the Board of Directors, Frederick C. Scobey.

Fall Meeting of Texas Section

Announcement has been received from Secretary E. N. Noyes that the Fall Meeting of the Texas Section will be held at San Antonio, Tex., on October 20th and 21st, 1922.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

FUTURE MEETINGS

October 4th, 1922.—8 P. M.—A regular monthly business meeting will be held, at which two papers will be presented for discussion, as follows: "Experiments with Models of the Gilboa Dam and Spillway", by R. W. Gausmann and C. M. Madden, Associate Members, Am. Soc. C. E.; and "The Engineering Geology of the Catskill Water Supply", by Charles P. Berkey, Esq., and James F. Sanborn, M. Am. Soc. C. E.

These papers are printed in this number of *Proceedings*.

FALL MEETING OF THE SOCIETY AT SAN FRANCISCO, CALIF., OCTOBER 4th-9th, 1922.

October 4th, 1922.—10 A. M. and 8 P. M.—Symposium on The Water Power Problem.

October 4th.—2 P. M.—Local excursions.

October 5th.—10 A. M.—Continuation of Symposium on The Water Power Problem.

October 5th.—2 P. M.—Local excursions.

October 5th.—6:30 P. M.—Dinner and Smoker.

October 6th to 9th.—Excursion to Don Pedro, Hetch Hetchy, and Yosemite Valley.

All excursions and social functions are in the hands of the following Local Committee on Arrangements:

A. H. MARKWART, Chairman,

H. D. DEWELL,

THOMAS H. MEANS,

ELY C. HUTCHINSON,

F. H. TIBBETTS.

LOCAL SECTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Section (Constitution Approved by Board, 1905).

Thomas H. Means, President; H. D. Dewell, Secretary-Treasurer, 503 Market Street, San Francisco, Calif.

Colorado Section (Constitution Approved by Board, 1909).

Thos. H. Olds, President; R. I. Meeker, Secretary-Treasurer, 4100 Zenobia Street, Denver, Colo.

Atlanta Section (Constitution Approved by Board, 1912).

William C. Spiker, President; Frederick H. McDonald, Secretary-Treasurer, 1530 Healy Building, Atlanta, Ga.

Baltimore Section (Constitution Approved by Board, 1914).

Ezra B. Whitman, President; George S. Robertson, Sr., Secretary-Treasurer, 1628 Linden Avenue, Baltimore, Md.

Buffalo Section (Constitution Approved by Board, 1921).

Walter McCulloh, President; John H. Feigel, Secretary-Treasurer, 492 Minnesota Ave., Buffalo, N. Y.

Central Ohio Section (Constitution Approved by Board, 1921).

Frank W. Jennings, President; H. F. Schryver, Secretary, 405 New York Central Building, Columbus, Ohio.

Cincinnati Section (Constitution Approved by Board, 1920).

Edgar Dow Gilman, President; Alphonse M. Westenhoff, Secretary, 709 Gwynne Building, Cincinnati, Ohio.

Cleveland Section (Constitution Approved by Board, 1915).

A. V. Ruggles, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Connecticut Section (Constitution Approved by Board, 1919).

Harold W. Griswold, President; Clarence M. Blair, Secretary-Treasurer, 785 Edgewood Avenue, New Haven, Conn.

Dayton Section (Constitution Approved by Board, 1922).

Charles H. Paul, President; K. C. Grant, Secretary-Treasurer, Winters Bank Building, Dayton, Ohio.

Detroit Section (Constitution Approved by Board, 1916).

H. H. Esselstyn, President; Alex. Linn Trout, Secretary-Treasurer, 110 North Ingalls Street, Ann Arbor, Mich.

District of Columbia Section (Constitution Approved by Board, 1916).

Gratz B. Strickler, President; James H. Van Wagener, Secretary-Treasurer, 2001 Sixteenth Street, N. W., Washington, D. C.

Duluth Section (Constitution Approved by Board, 1917).

William H. Hoyt, President; Walter G. Zimmermann, Secretary, 203 Wolvin Building, Duluth, Minn.

Illinois Section (Constitution Approved by Board, 1916).

A. J. Hammond, President; W. D. Gerber, Secretary-Treasurer, 913 Chamber of Commerce, Chicago, Ill.

Iowa Section (Constitution Approved by Board, 1920).

_____, President; R. W. Crum, Secretary, Care, Iowa State Highway Commission, Ames, Iowa.

Kansas City (Mo.) Section (Constitution Approved by Board, 1921).

John V. Hanna, President; Henry C. Tammen, Secretary-Treasurer, 1012 Baltimore Avenue, Kansas City, Mo.

Kansas Section (Constitution Approved by Board, 1920).

L. E. Conrad, President; F. W. Epps, Secretary-Treasurer, State Highway Comm., Topeka, Kans.

Lehigh Valley Section (Constitution Approved by Board, 1922).

George H. Blakeley, President; M. O. Fuller, Secretary-Treasurer, 732 Avenue H, Bethlehem, Pa.

Los Angeles Section (Constitution Approved by Board, 1913).

Ralph J. Reed, President; Floyd G. Dessery, Secretary, 618 Central Building, Los Angeles, Calif.

Louisiana Section (Constitution Approved by Board, 1914).

Donald Derickson, President; F. A. Muth, Secretary, 224 Custom House Building, New Orleans, La.

Nashville Section (Constitution Approved by Board, 1921).

B. H. Klyce, President; L. C. Anderson, Secretary-Treasurer, Bridge Building, Nashville, Tenn.

Nebraska Section (Constitution Approved by Board, 1917).

William Grant, President; Homer V. Knouse, Secretary-Treasurer, 200 City Hall, Omaha, Nebr.

New York Section (Constitution Approved by Board, 1920).

J. Vipond Davies, President; Harold M. Lewis, Secretary, 130 East 22d Street, New York City.

Northeastern Section (Constitution Approved by Board, 1921).

Frank B. Sanborn, Chairman; Charles W. Banks, Secretary-Treasurer, 715 Tremont Temple, Boston, Mass.

Northwestern Section (Constitution Approved by Board, 1914).

W. T. Walker, President; Paul C. Gauger, Secretary, 300 Endicott Building, St. Paul, Minn.

Oklahoma Section (Constitution Approved by Board, 1920).

Max L. Cunningham, President; R. E. Brownell, Secretary-Treasurer, 402 First National Bank Building, Oklahoma, Okla.

Philadelphia Section (Constitution Approved by Board, 1913).

William Easby, Jr., President; Charles H. Stevens, Secretary-Treasurer, 5918 North Park Avenue, Philadelphia, Pa.

Pittsburgh Section (Constitution Approved by Board, 1918).

J. N. Chester, President; Nathan Schein, Secretary-Treasurer, 1510 Carson Street, Pittsburgh, Pa.

Portland (Ore.) Section (Constitution Approved by Board, 1913).

F. M. Randlett, President; C. P. Keyser, Secretary, 318 City Hall, Portland, Ore.

Providence (R. I.) Section (Constitution Approved by Board, 1920).

Sydney Wilmot, Chairman; Robert L. Bowen, Secretary-Treasurer, 26 Sycamore Street, Providence, R. I.

Sacramento Section (Constitution Approved by Board, 1920).

Albert Givan, President; Joseph W. Gross, Secretary, Forum Building, Sacramento, Calif.

St. Louis Section (Constitution Approved by Board, 1914).

E. B. Fay, President; William C. E. Becker, Secretary-Treasurer, 426 City Hall, St. Louis, Mo.

San Diego Section (Constitution Approved by Board, 1915).

P. R. Watson, President; J. Y. Jewett, Secretary-Treasurer, Administration Building, Balboa Park, San Diego, Calif.

Seattle Section (Constitution Approved by Board, 1913).

F. F. Sinks, President; Frank H. Fowler, Secretary-Treasurer, 1319 L. C. Smith Building, Seattle, Wash.

Spokane Section (Constitution Approved by Board, 1914).

C. A. Burnette, President; Charles E. Davis, Secretary-Treasurer, 401 City Hall, Spokane, Wash.

Texas Section (Constitution Approved by Board, 1913).

E. B. Cushing, President; E. N. Noyes, Secretary-Treasurer, 1107 Dallas County Bank Building, Dallas, Tex.

Toledo Section (Constitution Approved by Board, 1922).

M. J. Riggs, President; George N. Schoonmaker, Secretary-Treasurer, 716 Stickney Avenue, Toledo, Ohio.

Utah Section (Constitution Approved by Board, 1916).

B. W. Matteson, President; H. S. Kleinschmidt, Secretary-Treasurer, 222 Felt Building, Salt Lake City, Utah.

Virginia Section (Constitution Approved by Board, 1922).

J. C. Carpenter, President; James F. MacTier, Secretary-Treasurer, 1312 Maple Avenue, Roanoke, Va.

STUDENT CHAPTERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS*

Stanford University.

R. I. Hill, President; John H. Colton, Corresponding Secretary, Box 121, Stanford, Calif.

Alabama Polytechnic Institute.

R. O. Davis, President; A. R. Harvey, Jr., Secretary, Box 661, Auburn, Ala.

Braune Civil Engineering Society (University of Cincinnati).

John W. Guilday, President; J. G. Appleton, Secretary, University of Cincinnati, Cincinnati, Ohio.

Bucknell University.

Ralph F. Hartz, President; Donald A. Davis, Secretary, Bucknell University, Lewisburg, Pa.

California Institute of Technology.

W. M. Taggart, President; Douglas A. Stromsoe, Secretary, California Institute of Technology, Pasadena, Calif.

Carnegie Institute of Technology.

H. T. Ward, President; J. K. Elliott, Secretary, Carnegie Institute of Technology, Pittsburgh, Pa.

Clemson Agricultural and Mechanical College of South Carolina.

J. H. Baumann, President; W. J. Stribling, Secretary, Clemson Agricultural and Mechanical College of South Carolina, Clemson College, S. C.

Cornell University.

Felix Spurney, President; Matthew J. Grogan, Secretary, Lincoln Hall, Cornell University, Ithaca, N. Y.

* By a recent ruling of the Board of Direction, the minimum membership of a Student Chapter has been fixed at 12 instead of 20.

Drexel Institute.

W. J. Carroll, Chairman; Paul J. Tritschler, Secretary-Treasurer, Drexel Institute, Philadelphia, Pa.

Georgia School of Technology.

F. H. Harrison, President; C. M. Kennedy, Jr., Secretary, 91 West North Avenue, Atlanta, Ga.

Iowa State College.

Raymond L. Whannel, President; C. La Verne Day, Secretary, Iowa State College, Ames, Iowa.

Johns Hopkins University.

W. A. Randall, President; I. M. Zeskind, Secretary, Johns Hopkins University, Baltimore, Md.

Lafayette College.

Douglas M. Brown, President; Ivan C. Blickenstaff, Secretary, Lafayette College, Easton, Pa.

Lehigh University.

John N. Marshall, President; George R. Swinton, Lehigh University, Bethlehem, Pa.

Massachusetts Institute of Technology.

George Eric Barnes, President; Ralph Rutherford Dresel, Secretary, 53 Brook Street, Brookline, Mass.

Montana State College.

Merrill J. Alquist, President; Emmett Moore, Secretary, 921 South Third Avenue, Bozeman, Mont.

New York University.

George H. Martin, President; Abram J. Jacobs, Secretary, 302 Gould Hall, New York University, New York City.

North Carolina State College of Agriculture and Engineering.

H. I. Ivey, Secretary, North Carolina State College, Raleigh, N. C.

Norwich University.

J. H. Kane, President; Allen J. Hamilton, Secretary, Norwich University, Northfield, Vt.

Ohio State University.

J. H. Jefferson, President; R. G. Glass, Secretary, 98 Fourteenth Avenue, Columbus, Ohio.

Oregon State Agricultural College.

Richard D. Slater, President; Wilbur H. Welch, Secretary, Oregon State Agricultural College, Corvallis, Ore.

Pennsylvania State College.

Arthur H. McFadden, President; Ralph R. Dobelbower, Secretary, Pennsylvania State College, State College, Pa.

Polytechnic Institute of Brooklyn.

W. C. Hanning, President; S. Lordi, Secretary, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Purdue University.

R. O. Edwards, President; W. C. Mason, Secretary-Treasurer, Purdue University, West Lafayette, Ind.

Rensselaer Polytechnic Institute.

R. T. Carlson, President; G. C. Stephens, Secretary, 3 Walnut Grove Place, Troy, N. Y.

Rose Polytechnic Institute.

Robert Cash, President; F. Ray Martin, Secretary-Treasurer, Rose Polytechnic Institute, Terre Haute, Ind.

Rutgers College.

L. C. Kuhl, Jr., President; A. C. Ely, Secretary, 105 Winants Hall, Rutgers College, New Brunswick, N. J.

Stadia Club (University of Oklahoma).

Lester W. Ellis, President; Edward W. Mars, Secretary, University of Oklahoma, 229 W. Buffy, Norman, Okla.

State University of Iowa.

James Fred Phillips, President; Louis E. Baggs, Secretary, State University of Iowa, Iowa City, Iowa.

Swarthmore College.

Frank Lemke, President; H. Chandlee Turner, Jr., Secretary, Swarthmore College, Swarthmore, Pa.

Syracuse University.

Arthur V. Dollard, Secretary, College of Applied Science, Syracuse University, Syracuse, N. Y.

University of California.

E. F. Sutherland, President; H. E. Hedger, Secretary, University of California, Berkeley, Calif.

University of Colorado.

Glen L. Mercer, President; F. K. Whiteside, Secretary, 1205 Thirteenth Street, Boulder, Ohio.

University of Illinois.

A. L. R. Sanders, President; M. E. Jansson, Secretary, University of Illinois, Urbana, Ill.

University of Kansas.

W. W. Hoagland, President; Waldo G. Bowman, Secretary, 1106 Ohio Street, Lawrence, Kans.

University of Kentucky.

H. J. Beam, President; H. E. Glenn, Secretary-Treasurer, 348 Harrison Avenue, Lexington, Ky.

University of Maine.

Ian M. Rusk, President; Clarence B. Gould, Secretary, Sigma Phi Sigma House, University of Maine, Orono, Me.

University of Minnesota.

C. L. Swanson, President, 1716 Tyler Street, N. E., Minneapolis, Minn.

University of Missouri.

W. K. Merridith, President; Charles Ogle, Secretary, University of Missouri, Columbia, Mo.

University of Nebraska.

J. E. Applegate, President; W. H. Mengel, Secretary, University of Nebraska, Lincoln, Nebr.

University of Pennsylvania.

Charles W. Foppert, President; Fred Welch, Secretary, University of Pennsylvania, Philadelphia, Pa.

University of Pittsburgh.

L. W. Fletcher, President; J. M. Daniels, Secretary, University of Pittsburgh, Pittsburgh, Pa.

University of Texas.

Frank Cannon, President; Claude Riney, Secretary, 1908 Wichita Street, Austin, Tex.

University of Virginia.

T. B. Kiener, Secretary, University of Virginia, University, Va.

University of Washington.

Alfred Jensen, President; H. L. Worthington, Secretary-Treasurer, 5011 Seventeenth Avenue, N. E., Seattle, Wash.

University of Wisconsin.

K. Zander, President; E. K. Loverud, Secretary-Treasurer, University of Wisconsin, Madison, Wis.

Virginia Military Institute.

Benjamin F. Parrott, President; R. G. Hunt, Secretary-Treasurer, Virginia Military Institute, Lexington, Va.

Virginia Polytechnic Institute.

W. S. Miles, President; J. Byron Herring, Secretary, Virginia Polytechnic Institute, Blacksburg, Va.

Washington University Collimation Club.

Clarence H. Miller, President; Roger C. Rowse, Secretary, 5650 Bartmer Avenue, St. Louis, Mo.

West Virginia University.

Rupert J. Snooks, President; Albert L. Kelley, Secretary-Treasurer, 660 High Street, Morgantown, W. Va.

William Cain Civil Engineering Society (University of North Carolina).

H. G. Baity, President; L. I. Lassiter, Secretary, University of North Carolina, Chapel Hill, N. C.

Worcester Polytechnic Institute.

Carl F. Meyer, President; Albert P. Hayden, Secretary, Worcester Polytechnic Institute, Worcester, Mass.

Yale University.

Harry W. Alexander, President; William H. Meyer, Secretary, Winchester Hall, Yale University, New Haven, Conn.

MEMBERSHIP

(From July 21st to August 8th, 1922)

ADDITIONS

HONORARY MEMBERS

Date of Membership.

CHAGNAUD, LEON-JEAN. Avenue Henri-Martin, 83, Paris, France..	June 19, 1922
FITZMAURICE, Sir MAURICE. (Coode, Fitzmaurice, Wilson & Mitchell), Westminster Chambers, 9 Victoria St., London, S. W. 1, England.....	June 19, 1922

MEMBERS

HEINZ, JOHN GEORGE. Eastern Mgr., Am. Wood Pipe Co., 30 Church St., New York City.....	June 19, 1922
HUNTER, ALFRED HUGHLYN. Div. Engr., Dist. No. 4, Illinois State Highway Dept., 300 South University St., Peoria, Ill.....	June 19, 1922
JACOBUS, ROBERT FULTON. Cons. Engr. (Francisco & Jacobus), 511 Fifth Ave., New York City.....	June 19, 1922
JACOBY, HURLBUT SMITH. Secy. and Chf. Engr., The H. K. Ferguson Co., 6523 Euclid Ave., Cleveland, Ohio	Assoc. M. Nov. 3, 1915 M. June 20, 1922
MALONEY, EDGAR WILLIAM. Div. Engr., New York Water Power Investigation, 84 Pine St., New York City (Res., 316 Caton Ave., Brooklyn, N. Y.).....	June 19, 1922
OAKLEY, GEORGE ISRAEL. Engr. and Supt., Guarantee Const. Co., 24 West Monroe St., Little Falls, N. Y.	Jun. Nov. 6, 1907 Assoc. M. June 20, 1922
SCHAUB, EUGENE. Civ. and Hydr. Engr., Logan, Utah.....	April 3, 1922
SINCLAIR, KARL AUGUSTUS. Chf. Engr., Warren Constr. Co., 289 East Salmon St., Portland, Ore.....	June 19, 1922
STEWART, RALPH WILLIAM. Chf. Deputy City Engr., 1200 Arapahoe St., Los Angeles, Calif.....	June 19, 1922
VOLCK, ADALBERT GEORGE. Asst. to Pres., Selznick Pictures Corporation (Res., 2011 Highland Ave.), Hollywood, Los Angeles, Calif.....	Jun. Dec. 1, 1908 Assoc. M. Dec. 5, 1911 M. June 20, 1922
WILLIAMS, SIDNEY JAMES. Chf. Engr., National Safety Council, 168 North Michigan Ave., Chicago, Ill.....	Assoc. M. Jan. 19, 1920 M. June 20, 1922

ASSOCIATE MEMBERS

BENNETT, FREDERICK GARDNER. Asst. Engr., Div. of Hydrology, New York Water Power Investigation, 84 Pine St., New York City (Res., 1809 Broadway, Far Rockaway, N. Y.)....	June 19, 1922
CORFIELD, SHIRLEY THOMAS. Asst. Div. Engr., California Highway Comm., 603 Rowell Bldg., Fresno, Calif.....	June 19, 1922
GOULD, HAROLD MOFFET. Elec. Engr., Dept. of Street Railways, City of Detroit, 2191 Cadillac Ave., Detroit, Mich.....	April 3, 1922
THOMAS, CHARLES MITCHELL. Deck Officer, U. S. Coast and Geodetic Survey, Care, Launch Wildcat, 202 Burke Bldg., Seattle, Wash.	June 19, 1922
TRIOL, EDWARD KENNEDY. Junior Bridge Engr., City of Seattle, 600 County City Bldg., Seattle, Wash.....	June 19, 1922

JUNIORS

	Date of Membership.
GREEN, FRANCIS KENNEDY. Box 129, Holden, W. Va.....	April 3, 1922
HOLLER, ARTHUR FOX. Care, A. H. Cipriani, 18 Henry St., Port of Spain, Trinidad.....	June 19, 1922

REINSTATEMENTS**MEMBER**

	Date of Reinstatement.
WALDRON, ALBERT EDWIN.....	July 18, 1922

RESIGNATIONS**MEMBER**

	Date of Resignation.
GETMAN, FRANK LAWTON.....	July 18, 1922

DEATHS

- HARRIS, ARCHIE LEE. Elected Associate Member, May 31st, 1910; died July 18th, 1922.
- HARRISSON, GERARDUS. Elected Associate Member, January 13th, 1919; date of death unknown.
- HOLLAND, ARTHUR FRANCIS. Elected Associate Member, October 14th, 1919; died June 22d, 1922.
- JOHNSON, ALBERT LINCOLN. Elected Associate Member, September 2d, 1896; Member, December 4th, 1901; died July 21st, 1922.
- MOORE, ROBERT. (*Past-President.*) Elected Member, April 5th, 1876; died July 24th, 1922.
- ROSS, JAMES GEORGE. Elected Member, May 28th, 1912; date of death unknown.
- SISSEOFF, SERGEI NICOLAEVITCH. Elected Member, March 13th, 1917; date of death unknown.
- SMITH, FRED CHARLES. Elected Associate Member, October 29th, 1912; died June 13th, 1922.

Total Membership of the Society, August 8th, 1922

Members	4 594
Associate Members.....	<u>5 254</u>
Corporate Members	9 848
Honorary Members.....	10
Juniors	454
Affiliates	169
Fellows	10
Total	10 491

ENGINEERING SOCIETIES EMPLOYMENT SERVICE

An Engineering Societies Service Bureau was established December 1st, 1918, as an activity of Engineering Council. It was managed by a board made up of the Secretaries of the four Founder Societies, and funds for its maintenance were provided by these Societies. On January 1st, 1921, this Bureau was taken over by The Federated American Engineering Societies and was known as the Employment Service of that organization. Recently, the management of the Service has been taken over by the Founder Societies. A weekly Employment Bulletin, listing the positions available, may be seen at the office of any Secretary of a Local Section. Members of the American Society of Civil Engineers who desire to register should apply for further information, registration forms, etc., to Walter V. Brown, Manager, Engineering Societies Building, 29 West 39th Street, New York City. In order to be included in the list published in *Proceedings*, copy must be received on or before the first of each month. All communications should be addressed to Mr. Brown.

EMPLOYMENT BULLETIN

POSITIONS AVAILABLE

RESIDENT ENGINEER for real estate development company. To be in charge of sewers, water supplies, streets, etc. Must live on property. Single man preferred. Application by letter. Location, N. J. V-1372.

CIVIL ENGINEER thoroughly experienced on dam construction to act as field manager. Must have handled negro labor. Application by letter. Location, South. V-1491.

ENGINEER with good stadia and municipal survey, both field and mapping, experience. Application by letter. Location, Mass. V-1582.

COLLEGE GRADUATES (1 or 2), with two to four years' experience, for drafting work; age 26 to 28 years. Some experience in field on heavy construction and part in drafting-room in a central office. Work would consist of designing and detailing concrete and steel structures in connection with hydro-electric developments and estimating and checking same. Ability to make hurried preliminary estimates covering entire hydro-electric plant layout highly desirable. Application by letter. Salary not stated. Location, Mass. V-1655.

BRIDGE DRAFTSMEN (2). Work consists of detailing structural steelwork for bridges and buildings, reinforced concrete work for concrete slab and arch bridges, etc. Application by letter. Location, Pa. V-1690.

ENGINEER with training and experience in design, construction, and operation of a sewage treatment plant. Plant estimated to cost approximately \$2,000,000. Application by letter. Salary not stated. Location, Ohio. V-1730.

ENGINEER for Chair of Civil Engineering, who has had some successful teaching experience, who is well grounded in scientific theory, and who is an administrator. Good personality. School of 1,000 students which is growing rapidly. Prefer some one who is now the head of a department in one of leading universities or who may be second man in such a department. Age between 30 and 40. Application by letter. Salary not stated. Location, Northeast. V-1760.

MAP DRAFTSMAN to plot railroad and land surveys from calculations. Experience on mining claim maps, railroad curves, or oil field layout would be satisfactory. Application by letter. Location, South America. V-1767.

STRUCTURAL STEEL DETAILER AND CHECKER AND THREE DRAFTSMEN on light structural work, stairs, balconies, etc. Application by letter. Location, Va. V-1784.

ENGINEER (C. E.) for installation of water mains in city streets. Experience in city street work desirable. Application by letter. Location, West. Va. V-1857.

ESTIMATOR on structural and ornamental steel. Capable of taking full charge of estimating and securing contracts. Good opportunity to become manager of plant. Experienced men only need apply. State age, education, experience, and salary desired. Application by letter. Location, N. J. V-1868.

STRUCTURAL STEEL DESIGNER for railroad bridges. Must have this experience. Application by letter, stating age, education, and experience. Location, N. Y. V-1895.

TOPOGRAPHICAL DRAFTSMAN on waterfront work. Temporary, but may be permanent if Civil Service examination is passed. Application in person. Location, New York City. V-1903.

ESTIMATOR (Building Construction) with at least 8 to 10 years' general estimating experience in structural work. Experience in New York City and vicinity much preferred. Salary not stated. Application by letter. Location, New York City. V-1912.

DESIGNERS on hydro-electric work. Civil engineer, graduate, with 5 to 7 years' experience on this class of work. Application by letter. Location, New York. V-1926.

INSTRUCTOR in Mathematics, including descriptive geometry and surveying. Appointment for three years beginning September, 1922. Recent graduate of some good engineering school preferred. Appointment by letter. Location, Syria. V-1929.

ASSISTANT PROFESSOR of Civil Engineering for next year. Should be prepared to teach surveying mechanics, hydraulics, structural design, concrete highways, etc. Salary not stated. Application by letter. Location, Pa. V-1932.

DRAFTSMAN experienced on docks, sewers, bulkheads, etc. Application in person. Location, Long Island City, N. Y. V-1935.

STRUCTURAL STEEL DRAFTSMAN AND CHECKERS (4). Permanent position. Salary not stated. Application in person. Location, Pittsburgh, Pa. V-1939.

CIVIL ENGINEER to design and construct piers, cribbing, docks, and water structures. Application by letter. Headquarters, New York City. V-1960.

ENGINEER, age 28 to 35, in Contract and Bond Department. Must have at least five years' active experience in construction work; good personality, and ability to talk convincingly. Must travel, so prefer single man. Not a high salaried position at start, but opportunity for advancement is good. Application by letter, giving complete data, including salary received in each position, and references. Interview can be arranged in any large city. Headquarters, Conn. V-1963.

GRADUATE ENGINEER, age not more than 35, to act as Instructor in Descriptive Geometry. Should have not less than three years' experience as mechanical draftsman with some reputable manufacturing concern. Application by letter. Location, Georgia. V-1975.

ESTIMATOR DRAFTSMAN, capable of taking off quantities and detailing ornamental stone-work. Some experience on construction work. Application in person. Location, New York. V-1979.

GENERAL SUPERINTENDENT of Construction on a 10-story flat slab reinforced concrete job, in Philadelphia, Pa. Must have this experience. Application by letter. Salary not stated. V-1994.

ESTIMATOR on reinforced concrete arches, etc., with 4 to 5 years' experience in this line. Application in person. Location, New York City. V-1997.

STRUCTURAL STEEL DETAILER experienced in shop detailing. Application in person. Location, New York City. V-2000.

SUPERINTENDENT of Construction. Application by letter. Location, Pa. V-2004.

EXPERIENCED CHECKERS (2) on structural steelwork. Must have had experience on buildings. Application in person. Location, New York City. V-2020.

DRAFTSMEN (2) on hydro-electric power plants. Civil engineer graduate with experience on heavy reinforced concrete. Application by letter. Location, New York City. V-2040.

DRAFTSMEN (2) for ships, hull, steelwork. Application in person. Salary not stated. Location, New York. V-2045.

DRAFTSMAN familiar with ships, joiners' work. Application in person. Salary not stated. Location, New York. V-2046.

INSTRUMENTMEN with railroad experience. Must have worked in Tropics and speak Spanish. Application by letter. Salary not stated. Location, Cuba. V-2051.

STRUCTURAL STEEL DETAILERS AND CHECKERS (5). Must be experienced men. Application in person. Location, New York City. V-2054.

MEN AVAILABLE

PROFESSOR IN CIVIL ENGINEERING and Head of such a Department in a high grade Engineering College desires to make a change. Graduate in Engineering, with post-graduate study in Education and Economics; twelve years' experience on large engineering works in positions of responsibility; ten years' experience in Engineering Education. Age, 40; married; health, excellent; least salary considered \$4 500 per collegiate year. CE-351.

ENGINEER AND SUPERINTENDENT OF CONSTRUCTION, Assoc. M. Am. Soc. C. E.; technical graduate; age 43; desires position with engineering firm or contractor. Twenty years' varied experience in office and field as Engineer, Superintendent of

Construction, and Executive, city improvements, water-works, streets and pavements, river and canal improvements, dredging, tunnels, deep foundations, steel and concrete structures, machinery, etc. Excellent record and reference. CE-352.

CONSTRUCTION ENGINEER, M. Am. Soc. C. E.; Graduate M. E., Stevens Institute of Technology; age, 36. Fifteen years' executive experience on design and construction of office buildings, steam and hydro-electric power plants, industrial plants, and large copper mining, milling, and reduction installation. Speaks Spanish and German fluently. Available immediately to go anywhere. Will subordinate initial salary to opportunity. Highest references. CE-353.

NEW BOOKS*

(From July 1st to July 31st, 1922)

**The statements made in these notices are taken from the books themselves,
and this Society is not responsible for them.**

DONATIONS TO ENGINEERING SOCIETIES LIBRARY**STEAM TURBINES.**

By William J. Goudie. Second Edition. Lond. and N. Y., Longmans, Green and Co., 1922. 804 pp., pl., diagrams, illus., 9 x 6 in., cloth. \$10.00.

This book has been written primarily to suit the requirements of engineering students, but the author hopes that the methods of calculation outlined in it will be useful also to engineers engaged in the design or operation of steam turbines. The first part is devoted to detailed descriptions of commercial representatives of the various types now on the market. The second part treats of what may be termed the "technical" part of the subject, nozzles, blading, rotors, gearing, steam consumption, proportions, governing, etc. This edition has been completely rewritten and enlarged.

MATHEMATICAL THEORY OF PROBABILITIES.

By Arne Fisher. Second Edition, Enlarged. N. Y., The Macmillan Co., 1922. 289 pp., 9 x 6 in., cloth. \$5.00.

The author's aim has been to treat all the modern researches on this important branch of applied mathematics from a common point of view, based on the mathematical principles laid down by Laplace, and to present a theory of probabilities, as developed in recent years, of value to the practical statistician, actuary, engineer, and biologist, as well as students of mathematics. This edition is extended to nearly twice its original size by added chapters on frequency functions and their applications. Mr. M. C. Rorty contributes an introductory note indicating some of the practical applications of the theory of probabilities to business problems.

CHEMICAL TECHNOLOGY AND ANALYSIS OF OILS, FATS AND WAXES: VOL. 2.

By J. Lewkowitsch. Sixth Edition, Revised by G. H. Warburton. Lond., Macmillan and Co., Ltd., 1922. 959 pp., illus., tab., 9 x 6 in., cloth. \$14.00.

The second volume of the new edition of this popular treatise is concerned with methods of preparing, refining, and examining the natural oils, fats, and waxes, and of detecting adulterations. It is an exhaustive summary of present knowledge on its subject, containing detailed chemical and physical data on all known oils. This edition has been carefully revised.

LES COLLOÏDES.

Par J. Duclaux. (*Actualités Scientifiques.*) Paris, Gauthier-Villars et Cie., 1922. 305 pp., 7 x 5 in., paper. 10 francs.

This work does not purport to be encyclopædic. It is, rather, a concise statement of chosen facts woven into a coherent account, from a single point of view, with useless details and superimposed theories avoided. Certain modifications have been made in the new edition. The author is Director of the Laboratory of the Pasteur Institute.

BELEUCHTUNG DER BAHNHÖFE UND DER BAHNHOFSHOCHBAUTEN.

Von Richard Sarre. (*Handbuch der Ingenieurwissenschaften*, 5. Teil, 5. Band.) Leipzig, Wilhelm Engelmann, 1922. 300 pp., illus., 10 x 7 in., cloth. 154 marks.

The primary object is to provide a discussion on the principles and systems of lighting railway stations and railway office buildings. As every existing method of lighting has been used for these purposes, however, and as the principles of artificial lighting are of general application, the book is, in reality, a concise survey of methods of illumination and of the laws governing their use.

ÜBER DIE FESTIGKEITSBERECHNUNG VON SCHIEBETOREN UND ÄHNLICHEN BAUWERKEN.

Von Adolf Eggenschwyler. Leipzig, H. A. Ludwig Degener, 1921. 148 pp., 9 x 6 in., paper.

This monograph discusses the problems in statics involved in the design of sliding sluice-gates, floating docks, movable weirs, and similar hydraulic structures composed of steel plates and frames. The statical problems that they present are, according to the author, midway between those of bridge building and shipbuilding, and have been much neglected. In consequence, the calculations of designers have been based on false assumptions, which have frequently led to an extravagant use of material and to lack of the necessary strength.

* Unless otherwise specified, books in this list have been donated by the publishers.

CURRENT CIVIL ENGINEERING LITERATURE

KEY TO ABBREVIATED REFERENCES TO PUBLICATIONS INDEXED*

Abbreviated References.	Publication.	Place.
Am. C. Inst.....	American Concrete Institute, Proceedings (Y.)	Detroit
A. I. E. E.....	American Institute of Electrical Engineers, Journal (M.)	New York
A. R. E. A.....	American Railway Engineering Association, Proceedings (Y.)	Chicago
A. S. T. M.....	American Society for Testing Materials, Proceedings (Y.)	Philadelphia
Am. Soc. C. E.....	American Society of Civil Engineers, Proceedings (M.)	New York
Am. Soc. Mun. Impvts.....	American Society for Municipal Improvements, Proceedings (Y.)	New York
Am. W. W. Assoc.....	American Waterworks Association, Journal (Bi-M.)	Baltimore
Am. Wood Prs. Assoc.....	American Wood Preservers Association, Proceedings (Y.)	Baltimore
Ann. P. et C.....	Annales des Ponts et Chaussées (Bi-M.)	Paris
Ann. T. P. Belg.....	Annales des Travaux Publics de Belgique (Bi-M.)	Brussels
Assoc. Ing. Gand.....	Annales de l'Association des Ingénieurs sortis des Ecoles Spéciales de Gand (Q.)	Ghent
Bost. Soc. C. E.....	Boston Society of Civil Engineers, Journal (M.)	Boston
Can. Engr.....	Canadian Engineer (W.)	Toronto
Cem. Eng.....	Cement and Engineering News (M.)	Chicago
Cornell C. E.....	Cornell Civil Engineer (M.)	Ithaca
Dock & Harbour.....	Dock and Harbour Authority (M.)	London
Eisenbau.....	Der Eisenbau (M.)	Leipzig
Eng.....	Engineering (W.)	London
Eng. Club, St. L.....	Engineers Club, St. Louis, Journal (Bi-M.)	St. Louis
Eng. & Contr.....	Engineering and Contracting (W.)	Chicago
Eng. Inst. Can.....	Engineering Institute of Canada, Journal (M.)	Montreal
Eng. N. R.....	Engineering News-Record (W.)	New York
Engrs. Soc. Pa.....	Engineers' Society of Pennsylvania, Journal (M.)	Harrisburg
Engrs. Soc. W. Pa.....	Engineers' Society of Western Pennsylvania, Journal (M.)	Pittsburgh
Engr.....	Engineer (W.)	London
Engrs. & Eng.....	Engineers and Engineering, Engineers' Club of Philadelphia (M.)	Philadelphia
Gen. Civ.....	Le Génie Civil (W.)	Paris
Gesund. Ing.....	Gesundheits Ingenieur (W.)	Munich
Inst. C. E.....	Institution of Civil Engineers Minutes of Proceedings (Q.)	London
Inst. Mun. & Co. Engrs.....	Institution of Municipal and County Engineers, Journal (W.)	London
Int. Ry. Assoc.....	International Railway Association, Bulletin (M.)	Brussels
Land. Arch.....	Landscape Architecture (M.)	Harrisburg
Mech. Eng.....	Mechanical Engineering (M.) Journal of the American Society of Mechanical Engineers	
Mil. Engr.....	Military Engineer (M.)	New York
Min. & Metal.....	Mining and Metallurgy (M.) American Institute of Mining Engineers	Washington
Mun. & Co. Eng.....	Municipal and County Engineering (M.)	New York
N. E. W. W. Assoc.....	New England Water Works Association, Journal (M.)	Indianapolis
N. Y. R. R Club.....	New York Railroad Club, Proceedings (M.)	Boston
Oest. Ing. Arch. Ver.....	Oesterreichischer Ingenieur und Architekten Verein, Zeitschrift (W.)	Brooklyn
Power.....	Power (W.)	Vienna
Rev. Gen.....	Revue Générale des Chemins de Fer (M.)	New York
Ry. Age.....	Railway Age (W.)	Paris
Ry. Main. Engr.....	Railway Maintenance Engineer (M.)	New York
Ry. Rev.....	Railway Review (W.)	Chicago
Schw. Bauz.....	Schweizerische Bauzeitung (W.)	Chicago
Sci. Am.....	Scientific American (M.)	Zurich
Soc. Ing. Civ. Fr.....	Société des Ingénieurs Civils de France, Mémoires et Comptes Rendus (Q.)	New York
Ver. deu. Ing.....	Verein deutscher Ingenieure, Zeitschrift (W.)	Paris
West. Ry. Club.....	Western Railway Club, Proceedings (M.)	Berlin
West. Soc. Engrs.....	Western Society of Engineers, Journal (M.)	Chicago
Zeit. Bau.....	Zeitschrift für Bauwesen (Q.)	Berlin
Z. d. Bauver.....	Zentralblatt der Bauverwaltung (Semi-Weekly)	Berlin

* Y = Yearly; Q = Quarterly; M = Monthly; F = Fortnightly; W = Weekly.

A. Applied Sciences

a. Processes of Calculation

2. Graphical and Nomographical

When Steel Beams Stretch.* P. J. Risdon. Sci. Am. July, '22.

B. Applied Mechanics

a. Mechanics of Solids (Strength of Materials)

2. Elastic Solids

Erweiterung der Clapeyronischen Gleichung.* (Expansion of the Clapeyron Equation.) Edgar Schmidt. Eisenbau, Apr., '22.

Wirtschaftlichste Querschnittsformen für I-Träger.* (The Most Economical Cross-Section Forms for I-Beams.) R. Sonntag. Z. d. Bauver. Apr. 26, '22.

Ueber die Knickfestigkeit mehrfach gestützter Stäbe.* (The Resistance to Lateral Bending of Beams with Multiple Supports.) Paul Boros. Z. d. Bauver. May 13, '22.

Ueber Drehung und Biegung.* (Torsion and Flexure.) R. Maillart. Schw. Bauz. May 20, '22.

3. Jointed Systems

Le calcul des Poutres a Diagonales Croisées.* (Calculation of Beams with Crossed Struts.) L. Descans. Gen. Civ. June 3, '22.

4. Riveted Systems

Beitrag zur Berechnung statisch unbestimmter Systeme.* (Contribution to the Calculation of Static Undetermined Systems.) P. Pasternak. Eisenbau. Mar., '22.

6. Heterogeneous Solids (Reinforced Materials)

Some Principles of the Construction of Unfired Pressure Vessels.* S. W. Miller. Mech. Eng. June, '22.

7. Pulverulent Masses (Earth Pressure)

Field Check on Formulas for Earth Pressure.* H. S. Schick. Eng. N. R. June 15, '22.

b. Hydraulics

2. Physical Hydraulics

Ueber die Bewegung des Wassers in künstlichen und natürlichen Gerinnen.* (The Motion of Water in Artificial and Natural Channels.) Josef Putzinger. Oest. Ing. Arch. Ver. Apr. 28, '22.

3. Industrial Hydraulics

Hydro-Electric Resources of the Scottish Highlands. Magnus Maclean. Engr. June 16, '22. The Allen Hydromat.* Engr. June 16, '22.

Queenston-Chippewa Hydro Development Largest in the World.* Power June 27, '22.

Economics of Water-Power Development.* Curtis A. Mees. Mech. Eng. July, '22.

Queenston-Chippewa Development of the Hydro-Electric Power Commission of Ontario.* F. A. Gaby. A. I. E. E. July, '22.

55 000 H. P. Turbines for the Queenston Power Station, Ontario.* Eng. July 14, '22.

Usine Hydro-Electrique de Fully (Valais, Suisse), Utilisant une Chute de 1 650 Metres.* (Tully Hydroelectric Plant (Valais, Switzerland) using a 1 650 Meter Head.) Ch. Dantin. Gen. Civ. Serial beginning May 6, '22.

Ueber das Mass der Wasserentnahme für ein Donaukraftwerk bei Wien.* (The Quantity of Water Drawn Off by a Danube Power Plant near Vienna.) Karl Grünhut. Oest. Ing. Arch. Ver. Serial beginning Apr. 28, '22.

Neues Verfahren zur Bestimmung der Wasserdurchflussmenge von Druckrohrleitungen.* (New Method for Determining the Flow of Water in Pressure Piping.) R. Winkel. Z. d. Bauver. May 6, '22.

C. Materials of Construction and General Processes

a. Lime, Cement, Mortar, Concrete, Brick, Bitumen, Timber, etc.

The Effect of Alkali Upon Concrete. S. H. McCroy. (From *Public Roads*.) Cem. Eng. June, '22.

To Avoid Variable Concrete Due to Variable Sand Wetness. R. L. Bertin. Eng. N. R. June 22, '22.

Aggregate Strength No Measure of Concrete Strength.* F. E. Giesecke. Eng. N. R. June 29, '22.

Tests on Molding of Concrete Under Pressure.* Hugh M. Nelson. Eng. N. R. July 6, '22.

Alkali Attack on Concrete Roads and Building Brick.* Irving Furlong. Eng. N. R. July 13, '22.

Zur Frage der zulässigen Beanspruchung von Bauholz.* (On the Question of the Permissible Stress in Timber for Construction Purposes.) Schönhöfer. Z. d. Bauver. May 17, '22.

e. Earthwork, Cubage, Excavating Machinery

Pelle Mécanique Rotative, Système Clère, pour les Travaux de Manutention et de Terrassement.* (Mechanical Rotating Shovel of the Clère Type for Handling of Materials and Earth Work.) E. Weiss. Gen. Civ. May 27, '22.

g. Execution of Works. Specifications

2. Of Concrete

Hardening Concrete Floors. Edward D. Boyer. Cem. Eng. June, '22.

Proper Finishing and Protection Against Rapid Drying, Important Features of Concrete Floor Construction. J. E. Freeman. (From *The Architect and Engineer*.) Eng. & Contr. June 28, '22.

4. Of Metal

Knickung und zulässige Beanspruchung für Flusseisen bei Hochbauten.* (Flexure and Permissible Stress for Iron in Building Construction.) Dietrich Rühl. Ver. deu. Ing. Apr. 22, '22.

h. Foundations

Continuous-Mat Foundations for 22-Story Building.* Eng. N. R. July 13, '22.

k. Tunnels and Tunneling-Shields

Hydro-Electric Development Involves Unusual Tunnel Job.* H. K. Fox. Eng. N. R. July 13, '22.

D. Highways**a. Location**

Design Features of Lincoln Highway "Ideal Section".* W. G. Thompson. Eng. N. R. June 15, '22.

c. Construction

Asphalt Pavements. Julius Adler. Engrs. & Eng. May, '22.

Native Lake Asphalts and Their Relation to City Paving. J. S. Miller. Engrs. & Eng. May, '22.

The Design of Bituminous Mixtures.* F. S. Besson. Engrs. & Eng. May, '22.

Comparison of Road Drainage by Deep Side Ditches and Tile Drains. Charles M. Upham. (Paper read before University of Michigan.) Mun. & Co. Eng. June, '22.

Recommended Procedure in the Construction of Granite Block Pavements.* Clarence D. Pollock. Mun. & Co. Eng. June, '22.

Man-Hour Cost of Heavy Paving, Lockport, Ill. Charles E. DeLeuw. Eng. N. R. July 6, '22.

Asphalt Used to Resurface Worn Brick Pavement.* D. A. Grant. Eng. N. R. July 6, '22.

Improving Improved Roads in Maryland.* Eng. N. R. July 13, '22.

d. Maintenance

Alkali Attack on Concrete Roads and Building Brick.* Irving Furlong. Eng. N. R. July 13, '22.

North Carolina Top-Soil Road Theory and Practice.* Eng. N. R. July 20, '22.

h. Vehicles. Automobiles

Results of Heavy Traffic on Pittsburgh Test Road.* Eng. N. R. June 29, '22.

E. Bridges, Viaducts and Arches**b. Iron or Steel Bridges and Vladucts**

Castleton Bridge Contracts Let.* Eng. N. R. June 15, '22.

Report on Calcutta Bridge Proposes 1500 Ft. Cantilever Structure. Eng. N. R. July 13, '22. Gerüstlose Brückenauswechselung in zweigleisiger Strecke.* (Changing Bridges in Double Track Lines without the Use of Scaffolding.) Leopold Herzka. Eisenbau. Apr., '22.

Die Wiederherstellung der Eisenbahnbrücke über den Donauarm Borcea in Rumänien.* (Restoration of the Railroad Bridge Over the Borcea Arm of the Danube in Roumania.) Julius Brummer. Ver. deu. Ing. Apr. 29, '22.

d. Concrete and Reinforced Concrete Bridges

The Thrust in Skew Arches.* Daniel Royce. Mun. & Co. Eng. June, '22.

Construction of Weymouth Backwater Dam and Roadway.* F. Cornelius. Inst. Mun. & Co. Engrs. June 3, '22.

e. Centerings. Scaffolds

Das Lehrgerüst für die Tiberbrücke Ponte San Giovanni.* (Scaffolding for the San Giovanni Bridge Over the Tiber.) Th. Bachmann. Schw. Bauz. May 6, '22.

h. Computations, Tests, etc.

Locomotive Loadings for Railway Bridges.* D. B. Steinman. Am. Soc. C. E. May, '22.

x. Miscellaneous

Maintenance Methods for Highway Bridges in Minnesota. E. J. Miller. (From *The Improvement Bulletin*.) Eng. & Contr. June 28, '22.

Hydraulic Design of Bridge Waterways.* Ivan E. Houk. Eng. N. R. June 29, '22.

F. Inland Waters**c. Regulation of Waterways—Volume of Discharge, Freshets, Floods, Soundings**

The Flood Problem in China.* H. T. Wright. Engr. June 2, '22.

Battling with the "Devil's Hole" in the Mississippi Flood.* A. L. Dabney. Eng. N. R. June 15, '22.

Power Development on the Colorado River and its Relation to Irrigation and Flood Control.* O. C. Merrill. A. I. E. July, '22.

Flood Control of the Mississippi River.* C. McD. Townsend. Mil. Engr. July-Aug., '22.

An Autographic Sounding Machine.* M. Meigs. Mil. Engr. July-Aug., '22.

Changes at Mouth of Columbia River 1903 to 1921.* R. E. Hickson. Mil. Engr. July-Aug., '22.

Trente Années d'Observations Hydro-métriques sur la Meuse Mitoyenne.* (Thirty Years of Hydrometric Observations on the Central Section of the Meuse.) M. A. Bijls. Ann. T. P. Belg. Pt. 1, '22.

e. Diverting Dams. Locks. Lifts. Elevators. Inclined Planes

Considerations Concernant l'Exécution à Sec et à Ciel Ouvert de l'Ecluse du Kruisschans par Rabattement Préalable de la Nappe Aquifère Obtenu par Pompage Lent et Continu dans des Batteries de Petits Puits Filtrants.* (On the Dry and Open Cut Methods of Construction of the Kruisschans Lock, by First Depressing the Water Bearing Strata by Slow and Continuous Pumping in Batteries of Small Filtering Wells.) M. Francois. Ann. T. P. Belg. Pt. 2, '22.

j. River and Lake Ports, Equipment

New River-and-Rail Terminals on the Mississippi.* Eng. N. R. July 6, '22.

k. Utilization of Inland Waterways, Freight, Capacity

Schiffahrt auf dem Oberrhein. (Navigation on the Upper Rhine.) Schw. Bauz. May 6, '22.

x. Miscellaneous

Hauptversammlung des deutschen Wasserwirtschafts- und Wasserkraftverbandes in Essen. (General Meeting of the German Water Conservation and Water Power Association in Essen.) Z. d. Bauver. Apr. 26, '22.

G. Maritime Works

c. Vessels and Maritime Navigation. Lighthouses. Buoys. Various Signals

The Canadian-Pacific Liner *Empress of Australia*.* Engr. June 23, '22.

The White Star Liner *Majestic*.* Eng. July 7, '22.

La Vitesse des Navires de Commerce et l'Etat Actuel des Constructions Navales. (The Speed of Commercial Vessels and the Status of Marine Construction.) A. Poidloue. Gen. Civ. May 27, '22.

d. Roads and Outer Harbors. Dikes and Jetties. Breakwaters

Reinforced Concrete Piers and Marine Works.* W. Noble Twelvetrees. (Paper read before the Concrete Inst.) Dock & Harbour Serial beginning July, '22.

g. Dredges and Dredging. Force Pumps. Refloating and Removing Wrecks. Ice-Breakers
The Bucket Ladder Dredger.* George Anderson. Dock & Harbour June, '22.

h. Wharves. Mooring Buoys. Harbor Equipment

The Problem of Dock Accommodation for the Thousand-foot Ship.* M. Du-Plat-Taylor. Dock & Harbour June, '22.

Re-instatement of Dock Entrance Gates at Seaham Harbour.* Dock & Harbour June, '22. Reinforced Concrete Piers and Marine Works.* W. Noble Twelvetrees. (Paper read before the Concrete Inst.) Dock & Harbour Serial beginning July, '22.

Dock Flottant en Béton Armé, de 2 000 Tonnes, du Port de Trieste.* (2 000 Ton Floating Dock of Reinforced Concrete at the Port of Trieste.) Gen. Civ. June 3, '22.

i. Harbors (General Articles)

The Port of Shanghai.* (Report of International Comm. of Inquiry.) Dock & Harbour June, '22.

The Port of Amsterdam: Its Trade and Development.* J. W. Roegholt. Dock & Harbour June, '22.

The Port of Calcutta and Its Development.* W. C. Ash. Dock & Harbour July, '22. Quelques Ports de Pêche Anglais et Néerlandais.* (Some English and Dutch Fishing Harbors.) D. Bouckaert and J. Mullie. Ann. T. P. Belg. Pt. 2, '22.

j. Dockyard Machinery and Shipyards. Dry Docks

The Enlargement of Deptford Dock, Sunderland.* Engr. June 16, '22.

H. Railroads. Street and Interurban Railways. Automobiles. Aeronautics

a. Railroads

1. General Articles

The Aftermath of Federal Control. James C. Davis. West. Ry. Club May 15, '22.

3. Roadbed. Construction Work. Tunnels

Aurora Track Elevation Expedites Traffic.* Ry. Age July 1, '22.

4. Track

Considérations Générales sur les Actions Réciproques de la Voie et du Matériel Roulant et sur le Calcul des Rails.* (General Considerations on the Reciprocal Action of the Track and Rolling Stock, and on Rail Calculations.) R. Desprets. Ann. P. et C. Pt. 2, '22.

Types Récents de Traverses en Béton Armé. (Recent Types of Reinforced Concrete Ties.) Gen. Civ. May 6, '22.

5. Signals and Safety Apparatus

On the Question of Locomotive Cab Signals.* Faustino Villa. Int. Ry. Assoc. May-June, '22.

British Approve Automatic Train Control. Ry. Age July 22, '22

6. Rolling Stock (Locomotives, Cars)

Practical Advantages of Locomotive Feed Water Heating.* Ry. Rev. June 10, '22.

Union Pacific Mountain Type Locomotive No. 7000.* Ry. Rev. June 10, '22.

- The Insulation of Railway Refrigerator Cars.* W. H. Winterrowd. Ry. Rev. June 10, '22.
- Spring Assemblages for Freight Car Trucks.* Geo. S. Chiles. Ry. Rev. June 10, '22.
- A 70-ton All Steel Gondola With Clasp Brake Equipment.* Ry. Rev. June 10, '22.
- How the C. M. & St. P. R. R. Designed Their New Gondola Cars.* Ry. Rev. June 10, '22.
- Electric Locomotives.* Vincent L. Raven. (Paper read before the Inst. of Mech. Engrs.) Eng. June 23, '22. Engr. June 16, '22.
- Development of a Practical Water Tube Locomotive Firebox.* Desider Ledacs Kiss. Ry. Rev. June 17, '22.
- Fifty More New Freight Locomotives for the Southern Pacific.* Ry. Rev. June 17, '22.
- The East Horndon Locomotive Failure. Eng. June 23, '22.
- Feed-Water Heaters for Locomotives.* Edouard Sauvage. (Paper read before the Inst. of Mech. Engrs.) Eng. June 23, '22.
- Report on Locomotive Feed Water Heaters. (Am. Ry. Assoc. Committee). Ry. Rev. June 24, '22.
- Current Problems in Boiler Design and Maintenance.* (Abstract of report of Am. Ry. Assoc. Committee). Ry. Rev. June 24, '22.
- Current Questions of Locomotive Design and Equipment.* (Abstract of report of Am. Ry. Assoc. Committee). Ry. Rev. June 24, '22.
- Brake Shoe and Brake Beam Report.* (Report of Am. Ry. Assoc. Committee.) Ry. Rev. June 24, '22.
- Progress Toward Standard Car Designs Shown in Report.* (Abstract from report of Am. Ry. Assoc. Committee.) Ry. Rev. June 24, '22.
- Direct Driving Axle Generators for Passenger Cars.* (Abstract of report of Am. Ry. Assoc. Committee.) Ry. Rev. June 24, '22.
- Eliminating Sources of Trouble in Tank Car Construction.* Abstract of report of Am. Ry. Assoc. Committee.) Ry. Rev. June 24, '22.
- Some Notes on Railway Refrigerator Cars.* W. H. Winterrowd. Mech. Eng. July, '22.
- Effect of Design on Headlight Maintenance.* R. Wayne Cargo. Ry. Age July 1, '22.
- Variations in Fuel Consumption per Net Ton Mile.* F. Lincoln Hutchins. Ry. Rev. July 8, '22.
- Effect of Tonnage and Speed on Fuel Consumption.* J. E. Davenport. (Abstract of paper read before Inter. Ry. Fuel Assoc.) Ry. Age July 8, '22.
- A Remarkable Mikado on the Michigan Central.* Ry. Age July 22, '22.
- Essai sur les Remorques Maxima des Locomotives à Marchandises. (Test on the Maximum Pull of Freight Locomotives.) L. E. Creplet. Ann. T. P. Belg. Pt. 1, '22.
- Chevalets de 100 Tonnes pour le Levage des Locomotives.* (100-Ton Stands for Lifting Locomotives.) Rev. Gen. May, '22.
- L'Utilisation des Combustibles sur les Chemins de Fer. Sixième Rapport de la Commission d'Utilisation des Combustibles. (Utilization of Fuels by Railroads. Sixth Report of the Commission on the Utilization of Fuels.) Gen. Civ. May 20, '22.
- Réchauffeurs d'Eau d'Alimentation et pompes Alimentaires pour Locomotives, Système Weir.* (Weir System of Feed Water Heaters and Feed Pumps for Locomotives.) Gen. Civ. May 27, '22.
- 7. Use of Electricity**
- On the Question of Electric Traction.* Ernest Gerard. Int. Ry. Assoc. May-June, '22.
- New Single Phase Equipment for the New Haven.* Walter H. Smith. Ry. Age June 17, '22.
- Electrification of the Chilean State Railways.* Engr. June 30, '22.
- Choice of a System for Electric Traction on Main Line Railways. L. Thormann. Eng. Serial beginning July 7, '22.
- 8. Stations. Engine Houses. Shops. Terminals**
- Terminal Stations for Passengers. L. Maccallini. Int. Ry. Assoc. May-June, '22.
- On the Question of Goods (Freight) Stations.* Howard G. Kelley. Int. Ry. Assoc. May-June, '22.
- A. T. & S. F. Ry. Shop Improvements at Albuquerque.* Ry. Rev. June 17, '22.
- Equipment and Operation of a Modern Steel Car Plant.* George A. Richardson. Ry. Rev. June 17, '22.
- New Haven Builds Freight Yards at Providence.* Ry. Age June 17, '22.
- Comparison of Mechanical Ashpits for Large Terminal. W. H. Eiker. Eng. N. R. June 22, '22.
- Scheduling of Car Equipment Through Repair Shops.* (Report of Am. Ry. Assoc. Committee.) Ry. Rev. June 24, '22.
- Recommend Improvements for St. Louis Terminal.* Eng. N. R. July 6, '22.
- Santa Fe Ry. Has Large Steel-Frame Shop with Glass Walls.* Eng. N. R. July 6, '22.
- Comprehensive Report on St. Louis Terminals.* Ry. Age July 8, '22.
- Another Relief Plan for Chicago Terminal System.* Eng. N. R. July 13, '22.
- Southern Pacific Builds Unique Engine Houses.* Ry. Age July 15, '22.
- Concrete-Unit Roundhouses on the Pennsylvania R. R.* Eng. N. R. July 20, '22.
- Unusual Ash Pits Feature New Engine Terminal.* Ry. Age July 22, '22.
- Die Erweiterung des Hauptbahnhofs von Amsterdam.* (Enlarging the Main Railroad Station at Amsterdam.) R. Bernhard. Z. d. Bauver. May 6, '22.
- 9. Technical and Commercial Use**
- Report of Committee on Loading Rules.* (Am. Ry. Assoc.) Ry. Rev. June 24, '22.
- Les Embranchements Industriels et leur Utilité.* (Factory Sidings and Their Usefulness.) M. R. Godfernau. Rev. Gen. May, '22.
- 10. Accidents**
- Disastrous Derailment at Winslow Junction, N. J.* Ry. Age July 8, '22.
- A Propos de l'Accident du Chemin de Fer de Versailles le 8 Mai 1842.* (The Accident on the Versailles Railroad on May 8, 1842.) Gen. Civ. May 6, '22.

x. Miscellaneous

- How to Handle Railway Scrap Most Efficiently.* (Abstract of report of Am. Ry. Assoc. Committee.) Ry. Rev. June 24, '22.
- Pennsylvania R. R. Will Extend Lines to Detroit.* Eng. N. R. June 29, '22.

d. Street Railways, Elevated Railways, Subways**4. Track**

Adjusting Track Construction to a Light Weight Street Car. R. G. Taber. (Paper read before Southwestern Elec. and Gas Assoc.) Eng. & Contr. June 21, '22.

e. Automobiles**2. Internal Combustion Engine Automobiles**

Der Stand des deutschen Lastkraftwagenbaues.* (The Status of German Auto Truck Construction.) Erwin Aders. Ver. deu. Ing. Serial beginning Apr. 22, '22.

f. Aeronautics**3. Aeroplanes**

Les Nouveaux Hangars à Avions du Port Aérien du Bourget près Paris.* (New Airplane Hangars for the Aerial Stations at Bourget, near Paris.) Ch. Dantin. Gen. Civ. May 27, '22.

I. Municipal Water-Works. Agricultural Engineering**a. General Articles**

Proposed Extension of the Metropolitan Water District.* X. H. Goodnough. N. E. W. W. Assoc. June, '22.

San Francisco's Water Supply Project.* M. M. O'Shaughnessy. Sci. Am. July, '22.

Irrigation Works in Formosa Being Built by Japan.* Eng. N. R. July 13, '22.

b. Hydrology. Water Resources

Water Supply from Gravel Strata. John W. Toyne. Mun. & Co. Eng. July, '22.

A Modification of the Vicari Method of Determining Maximum Runoff.* Kenneth Allen. Mun. & Co. Eng. July, '22.

Effect of Elevation Upon Run-Off from Catchment Areas.* Allen Hazen. Eng. N. R. July 13, '22.

c. Dams and Reservoirs

Core-Wall Construction in Deep Trench at Wanaque Dam.* Arthur H. Pratt. Eng. N. R. July 20, '22.

Rapport de la Mission Envoyée aux Etats-Unis par la Cie P. L. M. pour l'Etude des Grands Barrages.* (Report of the Mission sent to the United States by the P. L. M. Co., to Study Large Dams.) P. Feuilly and E. Touche. Ann. P. et C. Jan.-Feb., '22.

Die Bedeutung von Sammelbecken für die Ausnutzung der Wasserkräfte in Deutschland.* (The Importance of Reservoirs in the Utilization of Water Power in Germany.) W. Soldan. Ver. deu. Ing. Serial beginning Apr. 29, '22.

d. Analysis and Purification of Water

Pumping and Filter Plant at Sturgeon Falls, Ont.* Can. Engr. June 13, '22.

Quantitative Data in Stream Pollution Investigations. Earl B. Phelps. Mun. & Co. Eng. July, '22.

Aerators and Copper Sulphate for Tastes and Odors.* Eng. N. R. July 13, '22.

e. Distribution of Water

Investigation of Electrolysis on Steel Force Main at Akron, Ohio.* Victor B. Phillips. N. E. W. W. Assoc. June, '22.

A History of the Corrosion of the 36-Inch Steel Force Main at Akron, Ohio.* G. Gale Dixon. N. E. W. W. Assoc. June, '22.

The Design and Construction of the Gloversville Standpipe. Frank A. Marston. June, '22.

Electrification of Gate Valves.* Payne Dean. N. E. W. W. Assoc. June, '22.

The Efficiency of Irrigation. G. E. P. Smith. (From Bulletin issued by University of Arizona.) Eng. & Contr. June 14, '22.

Concrete Pipe with Improved Joints as Used in St. John, New Brunswick.* (From Contract Record.) Eng. & Contr. June 14, '22.

Power and Irrigation Development in Palestine.* Eng. N. R. June 22, '22.

The "Aquatole" Endless-Chain Pump.* Eng. June 30, '22.

Return-Flow Water from Irrigation Developments.* R. I. Meeker. Eng. N. R. July 20, '22.

Die zentrale Wasserversorgung von städtischen Siedlungen.* (Central Water Supply for a City of Small Dwellings.) Neuber. Z. d. Bauver. Apr. 29, '22.

f. Drainage of Land

Die Untergrundbewässerung.* (Subsoil Irrigation.) Gerhardt. Z. d. Bauver. May 10, '22.

Stand der Arbeiten zur Abschließung und Trockenlegung der Zuidersee. (Status of the Work of Closing in and Draining the Zuider Zee.) Schmidt. Z. d. Bauver. May 10, '22.

J. Sewerage. Sewage and Refuse Disposal**b. Sewage Disposal. Purification**

The Disposal of Sewage Screenings. William F. Morse. Mun. & Co. Eng. June, '22.

Hydraulics of Dosing Tanks and Trickling Filters.* E. E. Sands. Eng. N. R. July 13, '22.

K. Heat Engines**a. Steam Engines. Boilers**

The Atlas One-Cylinder Type Pass-Out Engine.* Engr. June 2, '22.

Why Engines are Compounded.* Power July 4, '22.

b. Gas and Oil Engines

Dieselmotoren, eine Untersuchung über ihre wirtschaftliche Verwendung.* (An Investigation on the Economical Use of Diesel Engines.) Alfred Büchi. Schw. Bauz. Serial beginning May 6, '22.

L. Electricity**a. Production of Electricity****2. Magneto and Dynamo. Electric Machines**

Questions Relating to Standards of Rating, with Particular Reference to Large Machines Using Class B Insulation.* F. D. Newbury. A. I. E. E. July, '22.
Untersuchung von Schwingungsscheinungen an Turbodynamos mit Hilfe des Vibrographen.* (Investigation of the Vibration Phenomena in Turbodynamos by Means of the Vibrograph.) Jos. Geiger. Ver. deu. Ing. May 6, '22.

b. Distribution and Transmission of Electricity**1. Power Plants**

La Production et la Transmission de l'Energie Electrique aux Etats-Unis.* (The Production and Transmission of Electric Energy in the United States.) M. Henri Issarte. Ann. P. et C. Jan.-Feb., '22.

2. Long Distance Transmission of Energy

220-Kv. Transmission.* R. J. C. Wood. A. I. E. E. July, '22.

3. Distribution and Wiring of Electricity

Dielectric Losses and Stresses in Relation to Cable Failures.* D. W. Roper. A. I. E. E. June, '22.

5. Transformers and Converters

Foettinger Transformers on a Liner.* Engr. July 7, '22.

The Resignalling of the Mersey Railway.* Engr. July 7, '22.

Transformers for Motor Starting.* J. B. Gibbs. Power July 25, '22.

6. Safety of Electric Distribution Systems. Laws and Regulations

Resistance Neutralization; An Application of Thermionic Circuits.* Edward Bennett and Leo James Peters. A. I. E. E. Mar., '22.

Baltimore Oil Circuit Breaker Tests.* H. C. Louis and A. F. Bang. A. I. E. E. June, '22.

An Overpotential Test for Insulators.* G. W. Lapp. A. I. E. E. July, '22.

Three Thousand Tests on the Dielectric Strength of Oil.* J. L. R. Hayden and W. N. Eddy.

A. I. E. E. July, '22.

Tests on General Electric Oil Circuit Breakers at Baltimore.* J. D. Hilliard. A. I. E. E. July, '22.

Tests on Westinghouse Oil Circuit Breakers at Baltimore.* J. B. MacNeill. A. I. E. E. July, '22.

d. Mechanical Uses of Electricity**1. Electric Motors**

Eine neue Senkbremsschaltung für Drehstrom-Kranmotoren.* (A New Brake Connection for Alternating Current Motors in Cranes, for Lowering Loads.) Ver. deu. Ing. Apr. 22, '22.

2. Servomotors. Hoists. Elevators. Handling Machinery

Operation of a Traction-Type Elevator-Machine Alternating-Current Motor Controller.* William Zepernick. Power July 4, '22.

e. Electro-Chemistry and Electrometallurgy

Recent Conclusions Pertaining to Electrical Precipitation.* Walter A. Schmidt. A. I. E. E. July, '22.

Electrical Engineering Features of the Electrical Precipitation Process.* G. G. H. Horne. A. I. E. E. July, '22.

f. Signals and Communication

Note on the Development of an Electron Tube Amplifier.* A. I. E. E. July, '22.

M. Architecture**a. Educational, Government and Scientific Buildings**

Der Umbau des Alten Rathauses in Potsdam.* (Renovation of the Old Town Hall in Potsdam.) Dreves. Z. d. Bauver. May 13, '22.

b. Business and Commercial Buildings

Heavy Steelwork in New Theater and Office Building.* Eng. N. R. June 22, '22.

Removal of Three First-Story Columns in Twenty-Seven Story Building.* Edward F. Weiskopf. Eng. N. R. July 6, '22.

c. Residences. Hotels

Kommunaler Wohnungsbau der Stadt Zürich von 1910 bis 1920.* (Municipal Dwelling Construction in the City of Zurich from 1910 to 1920.) Schw. Bauz. May 6, '22.

Kleinwohnungsbauten in Wädenswil.* (The Construction of Small Dwellings in Wädenswil.) Schw. Bauz. May 13, '22.

d. Storage Buildings

New Port Granary at Dublin.* Dock & Harbour June, '22.

The Terminal Elevator for State Barge Canal.* Sci. Am. July, '22.

f. Factories and Mill Buildings

Industrial Plants and Their Location.* F. Theo. Gnaedinger. Eng. Inst. Can. July, '22.
Plant Inventories Offer Field for Structural Engineer.* Francis W. Wilson. Eng. N. R. July 20, '22.

g. Other Buildings

Die ehemalige Zisterzienser-Abtei Wettingen und Ihre Wiederherstellung.* (The Former Zisterzienser Monastery at Wettingen and Its Restoration.) H. Albertini. Schw. Bauz. Serial beginning Apr. 8, '22.
Wettbewerb für ein Wehrmännerdenkmal des Kantons Zürich.* (Competition for a Soldiers Memorial for Zurich Canton.) Schw. Bauz. May 20, '22.

h. Roofs. Domes

Timber Roof Framing in Arkansas Capitol is 87 Years Old.* Eng. N. R. July 13, '22.
La Coupole-Décor Fortuny du Théâtre de la Scala, à Milan.* (The Fortuny Scenic Dome in the Scala Theatre in Milan.) Gen. Civ. May 20, '22.

i. Fire Protection

Factors Affecting Fire Resistance of Building Columns. S. H. Ingberg. Eng. N. R. June 29, '22.
New Data on Fire Safety from the Burlington Building Fire. Eng. N. R. July 20, '22.

x. Miscellaneous

Les Constructions Provisoires Pendant et Après la Guerre.* (Temporary Building Construction During and After the War.) M. F. Zanen. Ann. T. P. Belg. Pt. 1, '22.

N. Landscape Engineering

Twenty-Seven Years' Municipal Work in Tonbridge.* Wm. Laurence Bradley. Inst. Mun. & Co. Engr. May 20, '22.
Suggestions on Subdivision Planning. S. G. Swigart. Mun. & Co. Eng. June, '22.
Papers and Discussions on City Planning. (Abstracts read before National Conference on City Planning.) Eng. N. R. June 15, '22.
Garden Cities and Model Dwellings as Conceived by the French.* W. P. Mitchell. Eng. & Contr. June 28, '22.
Parks and Playgrounds.* Henry V. Hubbard. Land. Arch. July, '22.
Notes on Practical Forest Esthetics. Hans J. Koehler. Land. Arch. July, '22.
Bauzonen in London. (Building Zones in London.) J. Stübben. Z. d. Bauver. May 6, '22.
Die städtebaulichen Bestrebungen in den Vereinigten Staaten von Amerika. (City Construction Ideals in the United States of America.) Musil. Oest. Ing. Arch. Ver. May 12, '22.

O. Administration. Legislation. Economics. Statistics**b. Economic Questions of a General Character; Valuations, etc.**

Estimating Reproduction Cost of Buildings for Valuation.* F. E. Barnes. Eng. N. R. June 15, '22.

d. Administrative and Financial Management of Means of Communications**5. Railroads and Street Railways**

The Effect of Traffic Fluctuations on Operating Expenses. Ry. Age July 1, '22.
La Question des Transports dans l'Accord Belgo-Luxembourgeois. (The Question of Transportation in the Belgo-Luxembourg Agreement.) Marcel Peschaud. Rev. Gen. May, '22.

g. Engineering Education

Models in Civil Engineering Instruction.* J. T. Thompson. Eng. N. R. July 13, '22.

Q. Surveying and Geodesy

Marine Surveys.* E. Latham and P. Harrison. Engr. June 2, '22.
Exploratory Boring Needed as Guide to Design and Construction of Public Works.* James F. Sanborn. Eng. N. R. June 22, '22.
Power Company Makes Extensive Triangulation Survey.* W. Mussetter. Eng. N. R. June 29, '22.
Quantity Survey Service in the Public Works Field. William E. Skinner. Mun. & Co. Eng. July, '22.
The Value of Geodetic Control in City Survey Work. Hugh C. Mitchell. Eng. N. R. July 20, '22.